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DOCUMENT-IDENTIFIER: US 6537567 B1
TITLE: Tissue-engineered tubular construct having circumferentially oriented smooth muscle cells

Brief Summary Text (4):
Tissue engineering is emerging as a new field in the biomedical sciences. Langer and others have demonstrated the feasibility of seeding and culturing various cell types on biocompatible, biodegradable polymer films and three-dimensional scaffolds or substrates (Takeda et al. (1995); Vacanti et al. (1994); Mooney et al. (1994); Cao et al. (1994); Bell (1994); Gilbert et al. (1993); Freed et al. (1994a); Mooney et al. (1994); Cima et al. (1991); Cima and Langer (1993); Wintermantel et al. (1991); Mooney et al. (1992); Freed et al. (1994b); Freed et al. (1993)). Cell attachment, spreading and replication have been demonstrated to occur on these polymers, and the formation of solid tissue masses of up to one millimeter in thickness has been demonstrated for tissues such as cartilage (Freed et al. (1994a); Freed et al. (1994b); Freed et al. (1993)). Many cell types have been implanted successfully in vivo, including hepatocytes, chondrocytes, fibroblasts, enterocytes, smooth muscle cells and endothelial cells (Takeda et al. (1995); Mooney et al. (1994); Gilbert et al. (1993); Mooney et al. (1994)).

Brief Summary Text (17):
In each of the foregoing embodiments, a variety of cells may be seeded onto the substrates. These include smooth muscle cells, epithelial cells, endothelial cells, fibroblasts, myoblasts, hepatocytes, bile duct cells, pancreatic islet cells, thyroid, parathyroid, adrenal, hypothalamic, pituitary, ovarian, testicular, or salivary cells, cardiac muscle cells, renal cells, chondrocytes, nerve cells, and progenitor cells.

Detailed Description Text (38):
A number of different cell types or combinations thereof may be employed in the present invention, depending upon the intended function of the tissue-engineered construct being produced. Thus, for example, smooth muscle cells and endothelial cells may be employed for muscular, tubular tissue-engineered constructs (e.g., vascular, esophageal, intestinal, rectal, or ureteral constructs); hepatocytes and bile duct cells may be employed in liver tissue-engineered constructs; pancreatic islet cells may be employed in pancreatic tissue-engineered constructs; thyroid, parathyroid, adrenal, hypothalamic, pituitary, ovarian, testicular, or salivary secretory cells may be employed in corresponding glandular tissue-engineered constructs; cardiac muscle cells may be employed in heart tissue-engineered constructs; renal cells may be employed in kidney tissue-engineered constructs; chondrocytes may be employed in cartilaginous tissue-engineered tissue constructs; and epithelial, endothelial, fibroblast and nerve cells may be employed in tissue-engineered constructs for the great variety of tissues in which these cells are found. More generally, any cells may be employed which are found in the natural tissue to which the tissue-engineered construct is intended to correspond. In addition, progenitor cells, such as myoblasts or stem cells, may be advantageously employed to produce their corresponding differentiated cell types in a tissue-engineered construct.

Detailed Description Text (49):
Suitable growth conditions and media for cells in culture are well known in the art. Cell culture media typically comprise essential nutrients, but also optionally include additional elements (e.g., growth factors, salts and minerals) which may be

customized for the growth and differentiation of particular cell types. For example, "standard cell growth media" include Dulbecco's Modified Eagles Medium, low glucose (DMEM), with 110 mg/L pyruvate and glutamine, supplemented with 10-20% Fetal Bovine Serum (FBS) or 10-20% calf serum (CS) and 100 U/ml penicillin. Other standard media include Basal Medium Eagle, Minimal Essential Media, McCoy's 5A Medium, and the like, preferably supplemented as above (commercially available from, e.g., JRH Biosciences, Lenexa, Kans.; GIBCO, BRL, Grand Island, N.Y.; Sigma Chemical Co., St. Louis, Mo.).